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same proportion as the silver. By steeping for a few minutes in nitrous acid the silver is then dissolved; but the gold or platina remain unaffected, and require merely to be washed in distilled water in order to free them from any portion of the solution or other little impurities that may adhere during the solution.

The method employed by the author for coating gold wire is attended with more difficulty than he expected. A rod of silver having been previously drawn of considerable thickness, a hole was drilled through it longitudinally, and into this hole a gold wire was inserted so as to fill the hole. But in consequence of the toughness of fine silver, the operation of drilling was found extremely difficult, and this method was afterwards abandoned. It was found that platina might be advantageously substituted for gold, as in that case the first drawn wire might be coated with silver by fixing it in the axis of a cylindrical mould, and then pouring melted silver to fill the mould. The platina employed for this purpose was fused by the flame of a spirit lamp impelled by a current of oxygen, as contrived by Dr. Marcet: this platina having then been drawn alone to a wire  $\frac{1}{8}$  of an inch in diameter, it received a coating of silver that was just 80 times the thickness of the platina: accordingly when the silver was reduced by drawing to  $\frac{1}{80}$  of an inch in diameter, that of the platina was  $\frac{1}{8000}$ ; but nevertheless it remained surprisingly tenacious in proportion to its substance. The greatest relative tenacity is however thought to have been at about  $\frac{1}{8000}$  of an inch, which supported  $1\frac{1}{2}$  grain before it broke. Accordingly this wire admitted being drawn considerably finer, and the author has even obtained portions as slender as  $\frac{1}{80000}$  of an inch; but these were only in very short pieces, being in many places interrupted so that he could place no reliance upon any trials of their tenacity.

Some precautions are added respecting the method of freeing these wires from their coating of silver, with the recommendation of some little contrivances which the author has found convenient in handling objects so liable to be injured.

*Description of a single-lens Micrometer.* By William Hyde Wollaston, M.D. Sec. R.S. Read February 25, 1813. [*Phil. Trans.* 1813, p. 119.]

The author, being unable to measure some of his very small wires so accurately as he wished by any means at present in use, contrived the method here described, which he recommends as fully answering his expectations.

A lens having its focus at one twelfth of an inch is mounted in a plate of brass, and by the side of it is made a small perforation, as near to its centre as  $\frac{1}{12}$ th of an inch.

When a lens thus mounted is placed before the eye for the purpose of examining any small object, the eye can at the same time see distant objects through the adjacent perforation, by reason of the magnitude of the pupil, which is sufficient for receiving rays through

both the lens and the naked aperture. The magnified object may thus be compared with a scale of any large dimensions at such a distance as may best suit the convenience of the observer.

The author, however, recommends a small scale attached to the instrument, as better adapted for steady comparison with the object to be measured.

The instrument has externally the appearance of a telescope, consisting of three tubes, with the little lens at its smaller extremity; and in the place of the object-glass is fixed the scale of equal parts, which consists of pieces of wire placed side by side, and so proportioned in their lengths at regular intervals, as to be easily counted.

A wire of known dimensions, as for instance,  $\frac{1}{200}$ th of an inch, being then placed in a suitable position before the lens, the tube is drawn out till this wire apparently occupies fifty divisions upon the scale, and consequently each division at that distance corresponds to  $\frac{1}{50 \times 200}$  of an inch in the focus. Again, at half that distance the

same wire covers only twenty-five divisions, each of which now corresponds with  $\frac{1}{200}$ th of an inch seen in the focus of the eye-glass.

These numbers are marked accordingly on the outside of the tube, and the intermediate fractions  $\frac{1}{400}$ ,  $\frac{1}{600}$ , &c. are found by dividing the exterior scale into equal intervals. Hence in the measurement of any wire, the number of divisions which it occupies on the interior scale are to be noted as numerator, and the number marked on the tube externally as denominator of a fraction, expressing its dimensions in proportional parts of an inch. Since the correctness of the instrument depends on the precision with which the first wire is known as basis of the exterior indications, the wire is made of fine gold, and its dimensions determined by the weight of a given length.

*Observation of the Winter Solstice of 1812, with the Mural Circle at Greenwich. By John Pond, Esq. Astronomer Royal, F.R.S. Read February 25, 1813. [Phil. Trans. 1813, p. 123.]*

The weather was so extremely unfavourable, that it was not possible to obtain more than eight observations of the sun, from which the obliquity of the ecliptic at the late solstice could be deduced; from these it is inferred to have been  $23^{\circ} 27' 47'' \cdot 35$ , that from the summer solstice having been  $23^{\circ} 27' 51'' \cdot 3$ . This small discordance, it is observed, might be easily made to disappear by a slight modification of Bradley's refractions; but the Astronomer Royal has not yet had an opportunity of making a sufficient number of observations on circumpolar stars with the new circle, to warrant making any corrections in his table of refractions, and he leaves the subject of the discordance of the solstices for discussion in a separate paper.